

### **ABSTRACT**

A system for determining the position, orientation and system gain factor of a probe includes a plurality of magnetic field sources and at least one magnetic field sensor, such that a combination of a magnetic field sensor and a magnetic field source generates a unique  
5 measured magnetic field value. The system includes a probe whose gain, position, and orientation affect these unique measured magnetic field values. A processor is configured to receive and iteratively process these unique measured magnetic field values to determine a system gain factor indicative of the gain of the probe and a plurality of location factors indicative of the position and orientation of the probe. The number of unique measured  
10 magnetic field values generated must be at least equal to the sum of the number of gain and location factors calculated.

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